ROYAL ASTRONOMICAL SOCIETY.

VOL. XV. *Supplemental Notice.* No. 9.

Death of the Rev. Richard Sheepshanks.

It is with deep regret that the Editor has to announce the heavy loss which the Society has sustained during the recess, in the death of one of its most valuable and devoted adherents. On the 4th of August, 1855, the Rev. Richard Sheepshanks, M.A., after a short illness, expired at his residence in Reading, aged sixty-one years. This is not the occasion on which to advert at length to the admirable qualities of heart which endeared Mr. Sheepshanks to a wide circle of friends; nor to remark upon the disinterestedness with which he laboured throughout life in the cause of science, and more especially upon his untiring vigilance in promoting the interests of this Society during the long period of his connexion with it. All this will be recorded in the proper place. But the Editor may be permitted to state, that in the death of Mr. Sheepshanks he has to deplore the loss of a warmly-attached friend, whose valuable counsel and effective aid in discharging the duties of his office were invariably tendered with a cordiality and kindliness of feeling, the vivid recollection of which must constitute his apology for alluding to them here.

Observations of the Comet discovered at the Imperial Observatory at Paris on the 4th of June (Comet II., 1855), taken with the 8½-inch Achromatic Refractor of the Liverpool Observatory. By John Hartnup, Esq.

G.M.T.	Comet's R.A.	Log. $\frac{p}{P}$	N.P.D.	Log. $\frac{q}{P}$
1855. d h m s	h m s		° ′ ″	
June 9 11 27 3·5	7 51 51·70	+8·582	54 45 35·6	−9·9380
10 10 39 59·4	7 58 40·26	+8·641	55 3 0·6	−9·9057
10 11 18 6·1	7 58 51·01	+8·597	55 3 26·6	−9·9313

The observations are corrected for refraction. The corrections to be applied for parallax in time and arc are represented by p and q. P is the equatoreal horizontal parallax; star of comparison, B.A.C. 2860; assumed mean place for 1855, Jan. 0.

$8^h\ 24^m\ 3^s{\cdot}09$ R.A. $53^\circ\ 4'\ 32''{\cdot}65$ N.P.D.

Discovery of a New Planet. By M. Luther.

Mr. Hind has received a letter from M. Luther, dated October 8, announcing his discovery of a new planet at Bilk, on the 5th of the same month. It was situate in 2° 25′ of right ascension, and 0° 52′ of north declination, and resembled a star of the tenth magnitude. On the following evening he obtained this observation of it:—

	M.T. Berlin.	R.A.	N. Decl.
1855.	h m s	° ′ ″	° ′ ″
Oct. 6.	8 44 14·4	2 12 21·4	+0 49 18·2

This planet has received the designation of *Fides*, with the symbol of a cross.

On certain Anomalies presented by the Binary Star 70 Ophiuchi. By Capt. W. S. Jacob, Madras Astronomer.

The pair of stars designated as 70 *Ophiuchi* have been long recognised by astronomers as a binary system, but the authorities are not as yet agreed as to the exact orbit, although only about 20° are wanting to complete the whole ellipse since they were first measured by Sir W. Herschel in 1779.

Many hypothetical orbits have been computed, all of which fail at certain points in representing the observed quantities as closely as might be expected: thus, in some that have lately appeared, while the angles show a tolerably near agreement with observation, the distances are entirely thrown out, the maximum being represented as yet future; whereas, observation indicates a steady decrease in distance since 1848 or 1850, the quantity now amounting to 0″·50; any attempt, however, to alter the elements so as to bring the distances into better agreement, throws a considerable increase of error on the angles. There is, further, this remarkable point to be noticed, viz., that even in those orbits in which the distances are neglected, and the angles made to agree as closely as possible, the errors assume somewhat of a periodical or epicyclical form, continuing to have the same sign over a considerable extent of the orbit, and this is still more strongly marked when both angles and distances are taken into account. Thus, in an orbit which I have lately computed with a period of 93 years, the errors are + from 1820 to 1823, — with one exception from 1823 to 1830; from 1830 to 1832 there is a turning point, where the errors alternate; and from 1833 to 1842, they are again +; and from 1846 to the present time they are for the most part —.

Now such systematic errors can hardly be casual; they must

depend upon some law. It is just possible that they might arise from an erroneous assumption of the universal application of the law of gravitation; this law may be somewhat modified in these remote systems: the general evidence of observation is in favour of the law being everywhere the same as it is within the solar system, but the data are not exact enough to define this with certainty.

But there is a simpler mode of accounting for the discrepancy without having recourse to any change of law. We may suppose a third body to belong to the system, and to be opaque, and consequently invisible; such a body would, of course, disturb the regularity of the motions of the other two.

The existence of such dark bodies has been already surmised, though not fully demonstrated in the cases of certain apparently single stars, such as *Sirius* and *Procyon*. The body in this case, if it be supposed to circulate as a planet round the smaller star, need not be very large, for the observed amount of deviation of the star from its regular orbit is less than 0″·1 of arc.

I have computed the corrections to be applied on the hypothesis of the secondary orbit described by the smaller star having a semi-major axis of 0″·08, and an excentricity of 0″·15, a periodic time of 26 years, and motion direct, which seems to be somewhat near the truth, for a great improvement is at once manifested; without correction the average error of the angles in the interval from 1820 to 1855 is 49′, which is reduced by the corrections to 35′, or by more than one-fourth, while the maximum error is also reduced from 133′ to 94′. In the distance measures for the same interval the difference is less strongly marked, but the early measures are not worthy of much confidence; and if we consider only the time subsequent to 1838, which includes all the best measures, we find the average error reduced from 0″·14 to 0″·11, and the maximum from 0″·26 to 0″·19, being about the same proportion as above.

There is, then, some positive evidence in favour of the existence of a planetary body in connexion with this system, enough for us to pronounce it highly probable, and certainly good ground for watching the pair closely, to procure, if possible, still stronger evidence.

The corrections have not been applied to the three first observations, being those of Sir W. Herschel; these being isolated points, could be easily brought into agreement by a slight change of the elements, and would, therefore, furnish no test of the accuracy of the hypothesis.

Comparison of the Orbit of 70 Ophiuchi, with Observations.

Epoch.	Observed Position Angles.	Computed — Observed.	Error Corrected.*	Observed Distance.	Computed Distance.	Error.	Error Corrected.*
	° ′	′		″	″		
1779·77	90 0	+ 5	...	4·49	4·67		
1802·34	336 8	−136	...				
1804·41	318 48	+ 12	...	2·56	2·44		
1820·31	161 27	+133	+65				
1821·51	156 50	+107	+67				
1822·54	154 30	+ 25	+14				
1823·32	153 25	− 50	−41				
1825·56	148 12	− 92	−44	4·38	4·29		
1826·75	146 24	−133	−80				
1827·40	143 54	− 64	−10	4·51	4·64		
1828·67	140 18	+ 13	+67	4·79	4·87		
1829·50	139 30	− 23	+23	5·18	5·00		
1830·36	138 9	− 22	+ 8				
1830·50	137 28	+ 6	+35	5·65	5·20		
1830·76	136 24	+ 46	+71	5·43	5·24		
1831·55	136 8	− 5	+ 8	5·97	5·37		
1832·55	133 46	+ 53	+53	5·73	5·52		
1832·57	135 31	− 54	−54	5·50	5·52		
1833·42	132 49	+ 43	+33	6·14	5·65		
1833·59	132 30	+ 49	+37	5·98	5·68		
1835·56	130 36	+ 17	−13	5·97	5·91		
1836·81	128 36	+ 52	+12	6·33	6·05		
1837·64	127 30	+ 63	+19	6·40	6·14	″	″
1838·51	126 30	+ 67	+20	6·25	6·22	−·03	−·05
1842·55	122 24	+ 67	+27	6·68	6·57	−·11	−·06
1846·21	120 10	− 2	− 2	6·83	6·64	−·19	−·11
1848·12	118 50	− 27	−10	6·80	6·66	−·14	−·06
1850·48	115 11	+ 64	+94	6·86	6·65	−·21	−·17
·66	117 0	− 55	−23	6·50	6·64	+·14	+·16
1852·75	114 3	+ 5	+40	6·73	6·61	−·12	−·13
1853·60	114 39	− 77	−46	6·49	6·58	+·09	+·05
1854·08	113 39	− 44	−16	6·36	6·57	+·21	+·16
1854·24	113 2	− 16	+10	6·51	6·57	+·06	+·01
1854·73	113 43	− 84	−62	6·34	6·55	+·21	+·16
1855·45	111 35	+ 4	+21	6·26	6·52	+·26	+·19
		—	—			—	—
		49	35			·14	·11

Elements of the Orbit of 70 Ophiuchi.

τ = 1808^{y}·12
ϖ = 292° 32′
Ω = 304·32
λ = −20 28
e = ·4894
γ = 55° 16′ cos = [9·7557]
P = 93^{y}·10
n = 3°·867

* On the hypothesis of a secondary orbit, in which $a = 0''{\cdot}08$, $e = 0{\cdot}15$. $\varpi = 200°$, P = 26^{yr}, $\tau = 1825{\cdot}5$.

Elements of Comet II., 1855. By M. Bruhns.*

T	1855, May 29, 23896, M. T. Berlin.	
	° ′ ″	
π	240 15 18·4	Mean Equinox
Ω	260 52 43·1	1855, 0.
i	22 58 27·1	
Log q ...	9·745678	

Motion retrograde.

These elements were calculated from the Berlin observations of June 5, 6, and 7.

Discovery of a New Planet. By M. Goldschmidt.

On the 5th of October M. Goldschmidt discovered a new planet at Paris; it resembled a star of the 11–12th magnitude. The following observation of its right ascension was taken at the Imperial Observatory, Paris:—

1855.	M.T. Paris. h m s	R.A. h m s
Oct. 7	9 55 37·9	22 59 31·86

The declination is wanting.†

This planet has received the name of *Atalanta.*

Observations of the two New Planets discovered by M. Goldschmidt and M. Luther on October 5, 1855, made with the Hamburg Equatoreal. By Mr. G. Rümker.

(*Communicated by Dr. Lee.*)

M. Goldschmidt's New Planet (*Atalanta*).

1855.	Hamb. M.T. h m s	App. R.A. ° ′ ″	Decl. ° ′ ″	App. Place of Star of Comp. h m s	° ′ ″
Oct. 12	10 13 53	343 50 38·7	−6 48 42·3 (5 comp.)	22 56 59·44	−6 57 19·3
13	8 4 36	343 40 42·6	−6 40 34·5 (18 comp.)	22 55 33·91	−6 36 53·8

M. Luther's New Planet (*Fides*).

1855.	Hamb. M.T. h m s	App. R.A. ° ′ ″	Decl. ° ′ ″	App. Place of Star of Comp. h m s	° ′ ″
Oct. 7	7 50 57	2 0 3·3	+0 45 49·0 (17 comp.)	0 6 25 21	+0 34 59·3
8	7 46 54	1 47 14·9	+0 41 55·1 (15 comp.)	0 6 25 21 0 7 14 00	+0 34 59·3 +0 29 45·9
13	10 10 13	0 44 57·0	+0 23 59·4 (19 comp.)	0 2 4 94	0 26 30·3

* This is the comet alluded to at p. 203, as having been discovered by M. Klinkerfues on the 4th of June. It was also discovered independently on the same evening at the Imperial Observatory of Paris, by M. Dien, and on the *preceding* evening by Dr. Donati at Florence.—Editor.

† It appears to be about $-6\frac{1}{2}°$, see *infrà*.—Editor.

Supplement to the Nautical Almanac for the year 1859.

This Supplement (which has just been published previous to the appearance of the Almanac itself) contains Ephemerides for the year 1856, adapted to the meridian of Greenwich, of *Ceres*, *Pallas*, *Juno*, and *Vesta;* approximate at intervals of four days, and accurate at each transit near the times of their respective oppositions; with the elements from which they have been deduced. Also, approximate Ephemerides of all the newly-discovered Planets, with the exception of *Circe*, *Leucothea*, and the two just announced, one by Dr. Luther, and the other by Mr. Goldschmidt; with elements in a few special cases of addition of perturbations.

It may be proper to remark with respect to *Ceres* and *Juno*, that the necessity for a correction of their elements has been for some time apparent; but that as regards *Pallas* and *Vesta*, the case is less urgent, hence the reason for allowing the two latter to continue uncorrected for the present.

A letter has been received from Mr. Mayne, a gentleman residing in Killaloe, county of Clare, Ireland, in which he states, with reference to an extract of a letter from M. Sturm on the construction of cylindrical object-glasses, which was communicated to the Society by Dr. Lee, and inserted in the *Monthly Notices* for last June, that he purchased glasses of a similar construction in Paris as early as the year 1814. Mr. Mayne says nothing respecting the *practical value* of those glasses as regards their achromatic and other qualities; he, no doubt, presumes that any information on this point would be unnecessary. The Editor avails himself of this opportunity of repeating what has been already announced on several previous occasions — that the Society distinctly disavows any responsibility in connexion with the opinions expressed in any of the papers which appear in its publications.

The Editor is indebted to the Astronomer Royal for pointing out (in a letter dated Aug. 11, 1855) an oversight committed in a note inserted in the *Monthly Notices* for last June (p. 224), relative to the expediency of observing *Venus* on the occasion of her approaching inferior conjunction in October. "There is no possibility," says Mr. Airy, "of seeing *Venus* near this conjunction: 1st, because, even if she were in the ecliptic, the ecliptic itself is so nearly parallel to the horizon, that nothing can be seen within 30° of the sun (this, however, does not apply to the rising); 2dly, because she has a large southern latitude. The only conjunctions when *Venus* can be advantageously seen are those in the spring."

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Page 12, line 8 from bottom, *for* a large number, *read* a moderate number.
— 14, — 1, *for* were different, *read* were not different.
— — last line, *for* greater than unity, *read* less than unity.
— 49, line 2 from top, *for* Lieut. G. M. Gilliss, *read* Lieut. J. M. Gilliss.
— 159, — 11, *for* Comet I., 1855, *read* Comet V., 1854.
— 161, — 3 from bottom, *for* agreement, *read* argument.
— 174, — 10, *for* Comet II., 1855, *read* Comet I., 1855.
— 179, the upper line of Fig. X should be slightly curvilinear, so as to adapt itself to the periphery of the elliptical orbit of the star.
— 181, line 4 from bottom, *for* 52° 24′ 52″, *read* 52° 54′ 52″.

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